Second birth of seismic exploration

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It was 5 am on the clock when they phoned me from the Raspadskaya mine, and several people by frightened voices shouted that if there were no lining which was done at my requirement, would suffer 60 miners. It was at 8 am local, Kemerovo time, at the time of shift change, when two brigades meet underground, each of which consists of 30 people - the 4th and the first shift. By coincidence, the meeting point of both brigades this time was in the lining zone made according to our requirement.

The erection of lining was accompanied by a scandal and the expulsion of us from the mine, because, according to geologists, there was no need for lining. And the demand of some of the seconded to erect the lining where it is not needed, was perceived simply as a terrible violation of rules.

The sudden collapse of rocks - this is a curse for mines that occurs throughout the world almost every day. Type in the search engine "the collapse of rocks" in any language, and see for yourself. Nothing to do with it. Neither predict nor prevent.

I spent 16 years in the mines, and in my own skin I felt what the miner feels as he descends to his place of work. This is a feeling of complete insecurity and dependence on His Majesty Sluchay.

For me, this case meant the first verification of the reliability of the physical effect that I had discovered 5 years earlier during the first descent into the mine in my life.

It so happened that while doing so, I as if was passing the exam on the subject that I had taught students for 4 years at the Leningrad Mining Institute (LMI). This subject was called mine geophysics, and in fact, it was a seismic survey course, since seismic survey is practically the only geophysical method used in mines.

Seismic surveying is a geophysical method that, in order to build a section, uses elastic (acoustic) vibrations that occur during impact (or explosive) impact on the surface of the earth. It is assumed that these acoustic waves propagate in the earth’s thickness and, according to the laws of optics, pass and are reflected from geological structures lying in the earth’s depth, and it is assumed that these processes can be fixed by means of seismic receivers in the form of echo signals.

It was then, quite unexpectedly, it was discovered that the rock layer exhibits the properties of an elastic oscillatory system (EOS). I discovered this in the summer of 1977. Formally, I made a discovery, but in fact, I met with a long-familiar effect. Lord Kelvin (William Thomson) exactly 100 years earlier, in the 70s of the 19th century, discovered an electrical oscillatory system (oscillating LC circuit) and defined objects of this class, saying that an object that reacts to a blow with a damping harmonic (sinusoidal) signal is an oscillatory system.

But if the earth’s stratum does not consist of reflecting geological objects, but of a combination of oscillatory systems, then there can be no question of any reflections and passages. in this case, the desired equipment is not of oscilloscope type (as in the traditional seismic), and spectrum analyzer.

What happiness that I once read this definition of him, because now such a definition of an oscillating system is simply not to be found. Read what is written on this subject on the Internet. It seems that this is specifically written so that it was not clear to anyone.

The probability of this discovery by the results of mine measurements was close to zero. For this it was necessary that at one moment several events coincided, plus a compulsory radio engineering education, since only radio engineers can understand this effect.

The fact is that spectral-time representations as a section of mathematics are read only to students - future radio engineers, and it was solely from this spectral image of the seismic signal obtained in the mine by acoustic roof study that I recognized the vibrational properties of the rock layer above my head. Figure 1 shows this spectral image.

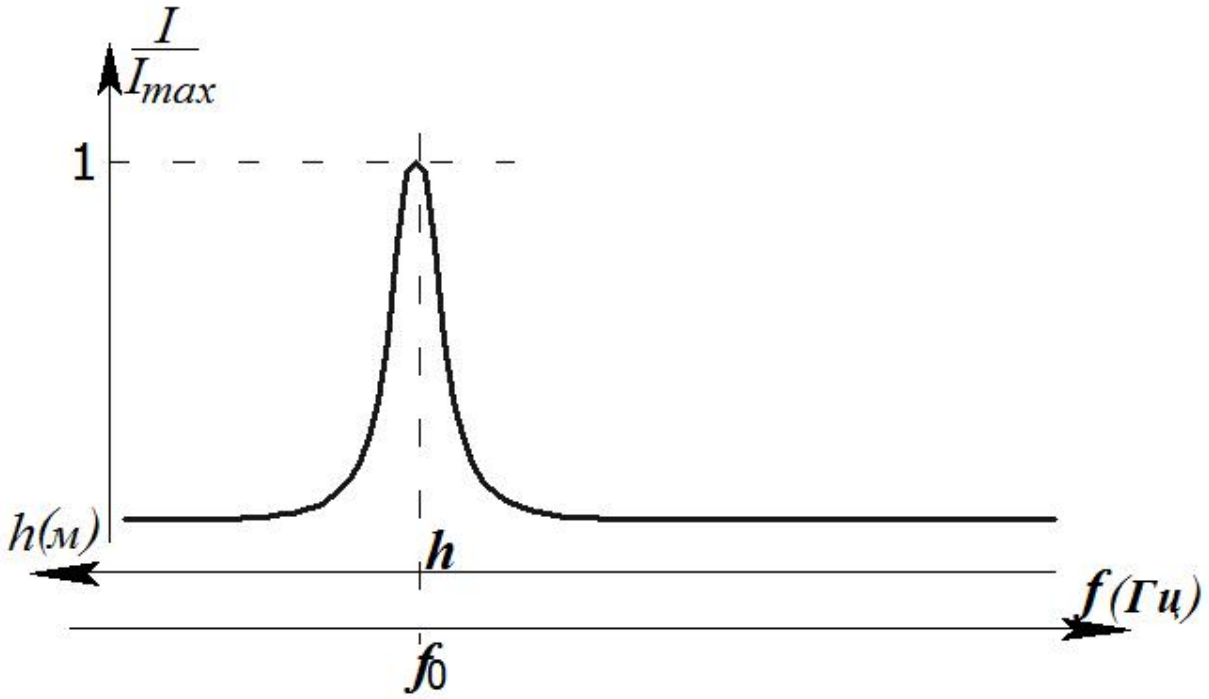

Fig. 1

The graph in Figure 1 is the frequency dependence of the amplitude of the field of elastic oscillations propagating along the rock layer.

In fact, everything is much simpler. The figure shown in Fig. 1 is nothing more than a spectral image of a damped sinusoid. The frequency f_0 is the frequency of the sinusoid occurring in the rock layer during shock impact on it. And the value of this frequency is uniquely related to the thickness of this rock layer *h*. This is already very important information, because knowledge of the value of h makes it possible to predict the collapse of this rock layer.

The inevitable question is: what, before this it was unknown? It was known, but it was possible to determine the value of h earlier in one and only way. Namely, by drilling into the roof, which in the conditions of the mine is almost impossible.

Thus, we were able to get not only the value of *h*, but even the structure of the roof rocks with the help of a simple blow to the rock layer lying in the roof, in the presence of a device that determines the frequency (or frequencies) of the signal the resulting impact produced by this blow. This, in fact, was the idea of the device, which allows to determine the stability of the roof.

For several years, we checked the operation of this device and the consistency of its testimony with the actual structure of roof rocks obtained by geological methods, as well as how accurately we can predict the stability of roof rocks when using this device.

Here is the closing point of this test and there was a requirement the buildingof lining, which is written at the beginning of this article.

The resulting method of predicting the collapse of rocks was all good, but ... In order to make such measurements, it was necessary to descend into the mine. And in the mine measurements can be done only in existing workings. That is, the prediction by this method can only be operational. But if measurements could be done from the earth's surface, without going down into the mine ...

And Something more seemed to have heard these wishes of geologists. And we were kicked out of the LMI. And therefore, we have lost access to the mines. I think everyone who is busy creating something new knows this problem. New - it is always defenseless, and destroy it is not difficult. And the pleasure from it, probably, can be received. This happened in 1993 year.

And if anyone remembers what happened in Russia that year, he will understand that there were only two options for us when we lost our job. Either to go to work in a kiosk, or in the guard. We chose the third option and tried to make the same measurements as we did for 16

years in the mines, but from the surfase, from the lawn. This profile defined our entire future life. And we are very grateful to the LGI leadership for our departure from the institute.

The geophysical method by which we began to work is in its essence spectral-seismic profiling (SSP), and the equipment with which it can be implemented has also been named.

At the first profiling by the SSP method, we discovered a new geological object in the Earth, which, as it turned out, cannot be detected by any other geophysical method other than the SSP. Since in the atmosphere above this object, radon is exceeded over the background, we, on the advice of geologists, called it tectonic zones (TZ). Naturally, all geologists and geophysicists began to tell us that this object can be detected using any other, already known method. But it turned out that TZ has a large number of previously unknown properties. And since no other geophysical method can detect any of these properties, they cannot reveal these TZ either. What further confirmed. And now I will tell you what these properties are.

Property number 1. When crossing the TZ profile, a specific object with a funnel-like shape is drawn on the SSP-section. Figure 2 shows an example of such a cut.

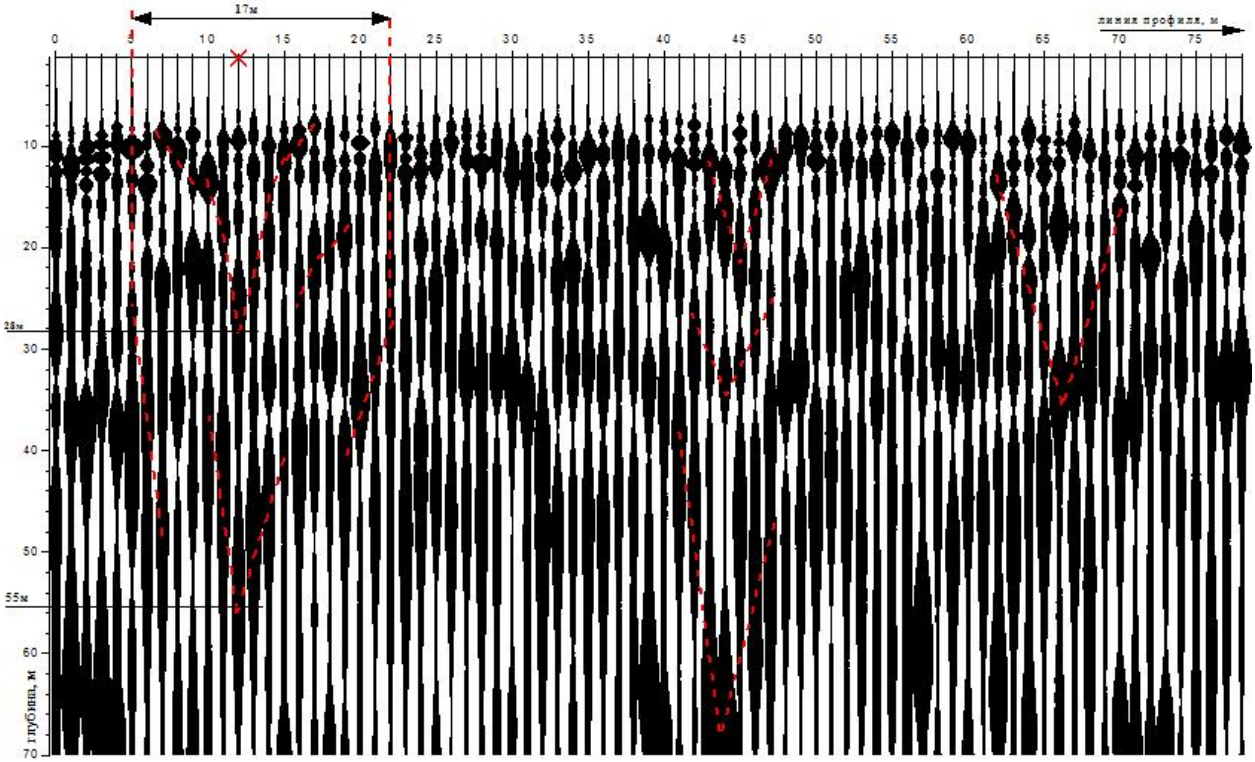

Fig. 2

In fig.2 there are three such funnel-shaped objects. With centers around the 12th, 45th and 66th meters of the profile. This corresponds to three TZ.

Property number 2. If the engineering structure is in TZ, it will be collapse. This property has been tested for several years. We were SSP-profiles in the immediate vicinity of structures, the destruction of which could be detected purely visually. Signs of destruction: vertical and sub-vertical cracks in the walls. If the house is brick, then these cracks tear the bricks. The cracks going through the corners of the window covers. If the house is running vibrating technology, the destruction occurs especially quickly. Fall roofs and intermediate floors.

Property number 3. If we drill through the center of TZ, we will be able to receive spring water. The same water, having the same source, can quench thirst, but it can also flood the mine. The water will come from the depth where the tip of the funnel-shaped object is located. In relation to TZ with a center of about 12 meters, the water will come from two depths - 28 and 55m.

Property number 4. Rocks in TZ are in a highly fractured state. Therefore, when drilling in TZ, the drilling tool goes significantly easier than outside TZ. Often a drilling tool even slumps.

Therefore, the missing pieces of core bring from other wells. I was very surprised when I learned that this is world practice.

Here lies the reason for the collapse of rocks in the mines. It is logical that the collapse occurs where the rocks are destroyed, that is, in TZ. Also, according to this logic, accidents occur and in the quarries.

Property number 5. Funnel-shaped objects are the upper part of vertical cracks, which originate in the perinuclear space. Hence, the appearance of radon over TZ, and other deep gases, as well as methane, and pure hydrogen. This is the reason why TZ exhibits the properties of geopathic zones. Under the influence of gases in TZ, on the first floors of most houses there is the greatest number of cancer patients.

Property number 6. Since TZ correspond to cracks in the crust of the Earth, their location on the surface of the Earth is chaotic. As pores on our skin, they are scattered randomly and are located on the entire surface of our planet. And, therefore, in accordance with the property number 3, anhydrous spaces do not exist.

Studying TZ is a way to solve a large number of tasks that were impossible to solve before.

But back to the mines. I gave them so much that they are just a sore subject for me. When I began to study the properties of TZ, I suddenly realized that in order to predict the meeting of underground workings with TZ, it is absolutely not necessary to go down into the mine. These zones from above, from a surface, are visible much better. I wrote an article about this, and I was invited to come to the mining town of Belovo so that I could demonstrate this idea. And during this demonstration I was able to detect TZ, which was on the way of the future, not yet existing uderground road.

Showing this point on the mine plan, I left. Arriving there a year later, I learned that at this place as a result of the collapse of the roof rocks three mine workers were killed ...

It is known that everything in our life depends on people. You can create any technology, find any solution, but if for people who make decisions, this new development is unacceptable, well, it will not be accepted. The reason why our development (SSP) is not accepted is banal.

The fact is that for more than 100 years there has been a seismic survey, called ray. The principle of its operation is determined by substantially simpler, understandable, obvious and logical provisions. And its software is at a higher level than that of spectral seismic surveys. Ray seismic exploration is unconditionally accepted throughout the world. Funds are allocated for its use, 20 times larger than for the rest of geophysics. But…

As it turned out, ray seismic survey turned out to be a scientific delusion. For all the time of its existence there is not a single case of coincidence of the seismic section with the geological section, obtained by drilling. And, most importantly, it is that none of its thesis can be proved experimentally.

According to the principles of the methodology for the development of scientific knowledge, the basis of any research method should be a physical effect that can be confirmed experimentally. Alas for the ray seismic survey such effect does not exist.

All its provisions are obvious, but it is impossible to prove experimentally. But, as you know, the obviousnesses, not proven experimentally - is the way to a dead end. Mathematics cannot replace experiment. It serves to describe the experimentally obtained data. And since there is no such data, in seismic exploration it serves to describe mentally given information.

During the existence of our civilization, there have been many such cases. All these cases are known. This is both the fact that the Earth is flat, and the fact that heavy objects fly with greater acceleration than the lungs... All these misunderstandings were resolved through experiments. But this is not enough. In order to move from one paradigm to another, it is necessary that the people acting in these areas of knowledge agree with this. And this turns out to be the most difficult. For this need to pass the time equal to the change of one or two generations. The history of physics estimates this time at about 50 years. Well, let's wait ...